RESEARCH DEPARTMENT

Transmitting aerials for the Enniskillen v.h.f. television and v.h.f. sound station

TECHNOLOGICAL REPORT No. E-101

1964/21

THE BRITISH BROADCASTING CORPORATION
ENGINEERING DIVISION

RESEARCH DEPARTMENT

TRANSMITTING AERIALS FOR THE ENNISKILLEN V.H.F. TELEVISION AND V.H.F. SOUND STATION

Technological Report No. E-101

(1964/21)

D. Osborne, A.M.I.E.E.

(W. Proctor Wilson)

April, 1964

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INTRODUCTION

The Enniskillen relay station came into operation on 24th February 1964. It provides a television and v.h.f. sound service to Co. Fermanagh and part of Co. Tyrone, the main towns in the service area being Omagh, Enniskillen and Fintona.

SUMMARY OF INSTALLATION

Site: The site is on Brougher Mountain about 8 miles (12·8 km) north-east of Enniskillen, grid reference 23/350527, height 1000 ft (305 m) a.m.s.l.

Support Structure: The support structure consists of a 150 ft (46 m) square-section self-supporting tower, with a 25 ft (7·6 m) cantilever topmast. The tower is oriented with one side on a bearing of 20° ETN.

General Arrangement: See Fig. 1.

Band I

Channel: Channel 5, with vertical polarization, is used. Both vision and sound carriers are offset -16·875 kc/s.

Aerial: The aerial consists of four tiers each of one vertical $\lambda/2$ dipole mounted on a bearing of 290° ETN and spaced 8 ft 2 in (2·5 m) from the axis of the tower. The inter-tier spacing is $1{\cdot}0\lambda$ and the mean height 122 ft (37 m) a.g.l. The tower side dimension for the top three tiers is 2 ft 9 in (0·84 m); the tower tapers from the 115 ft (35 m) level and the side dimension for the bottom tier is 4 ft 8 in (1·42 m). There are independent main feeders to each two-tier half-aerial.

Power: Two 500 watt translator amplifiers are used.

Templet and Horizontal Radiation Pattern (h.r.p.): See Fig. 2 and Note 1.

Gain:

Mean intrinsic gain			6·5 dB
Deduct: losses due to distribution feeders and possible misalignment			0·2 dB
Mean net gain			6·3 dB
Deduct: loss in main feeder (type HM11)	0·4 dB		
network loss	0·6 dB		1·0 dB
Mean effective gain			5·3 dB

Band II

Carrier Frequencies: 88·9 (Light), 91·1 (Third), 93·3 (Northern Ireland Home) Mc/s

The aerial consists of four tiers of crossed $\lambda/2$ dipoles; the inter-tier spacing is $0{\cdot}5\lambda$ and the mean height is 163 ft (50 m) a.g.l. The aerial is mounted on a cantilever pole above the main support tower and is oriented with one dipole limb on a bearing of 87·5° ETN. There are independent main feeders to each two-tier half-aerial.

Power: Two 1 kW translator amplifiers, under-run at 0·85 kW each, are used for each programme.

Templet and h.r.p. See Fig. 3 and Note 2.

Gain:

Mean intrinsic gain			3·3 dB
Deduct: losses due to distribution feeders and possible misalignment			0·2 dB
Mean net gain			3·1 dB
Deduct: loss in main feeder (type HM11)	0·5 dB		
network loss	0·9 dB		1·4 dB
Mean effective gain			1·7 dB

Programme Links: Both television and v.h.f. sound programmes are obtained by direct pick-up, on site, of the transmissions from Divis. The receiving aerials are mounted on a 75 ft (23 m) self-supporting tower. Protection against precipitation-static interference with television reception is given by

the use of a shrouded receiving aerial in conjunction with a corona-protection spike and parasitic reflectors which surmount the tower.

Notes: Band I

1. The aerial design was based on a theoretical prediction of the h.r.p. of each tier assuming a cylindrical support mast electrically equivalent to the square tower section. This approximation gives reasonable accuracy since the mean tower cross-section is relatively small (0·19λ square) and the dipole/tower spacing relatively large (about 0·5λ from the tower axis).

Band II

2. This aerial is an existing well-known type for which the h.r.p. may be calculated accurately.

ACKNOWLEDGEMENT

The basic design of the Band I aerial was carried out by Mr. G.H. Millard.

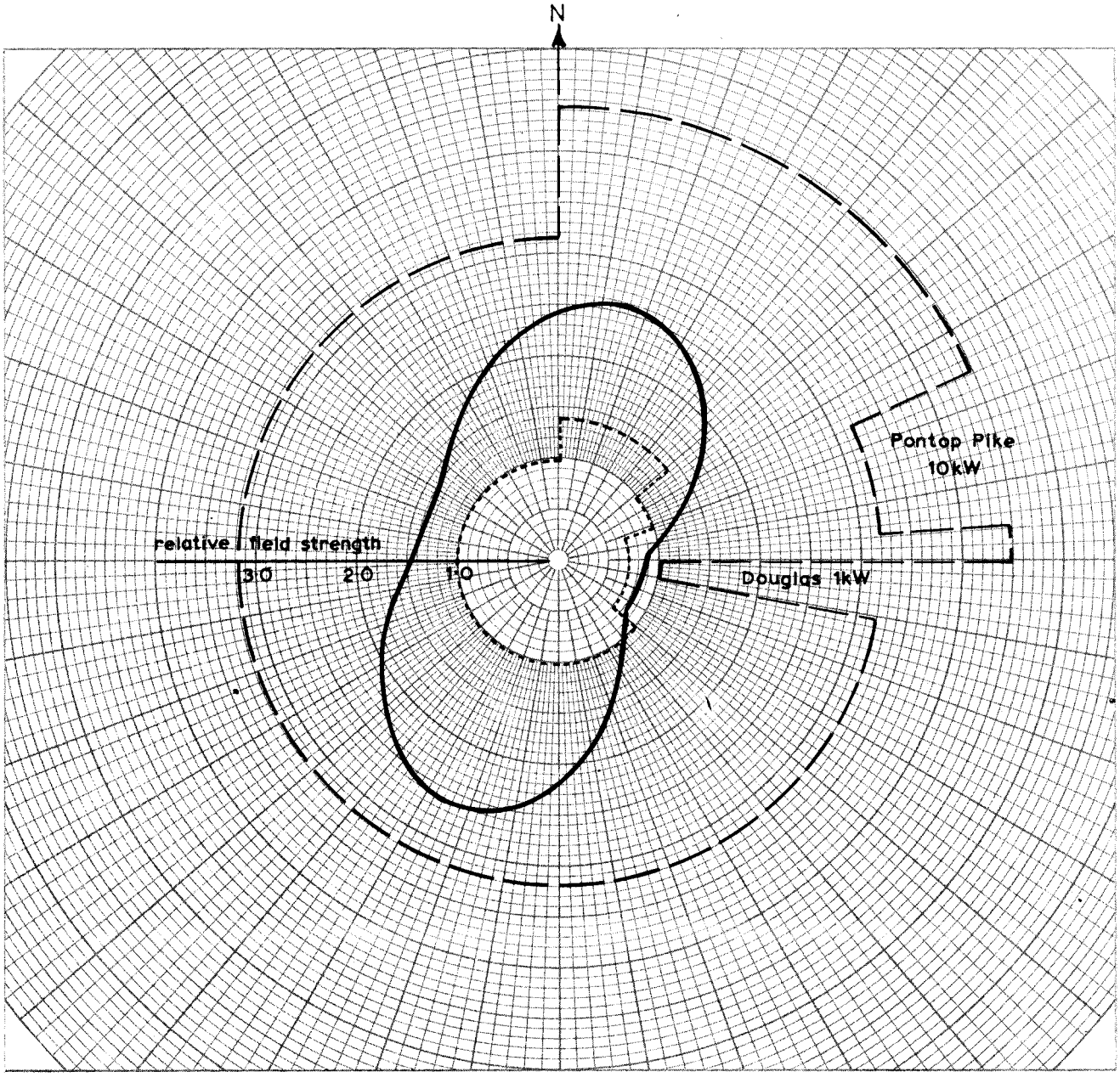

Fig. 2 Templet and horizontal radiation pattern of Band I aerial

VERTICAL POLARIZATION

Channel 5 (Vision carrier 66·75Mc/s Sound carrier 63·25Mc/s .

Mean effective gain 5·3dB — — — Maximum permissible E.R.P.

Transmitter power 2x0·5kW ····· Minimum desirable E.R.P.

Mean E.R.P. 3·4kW

Unit field corresponds to an E.R.P. of 1·0kW

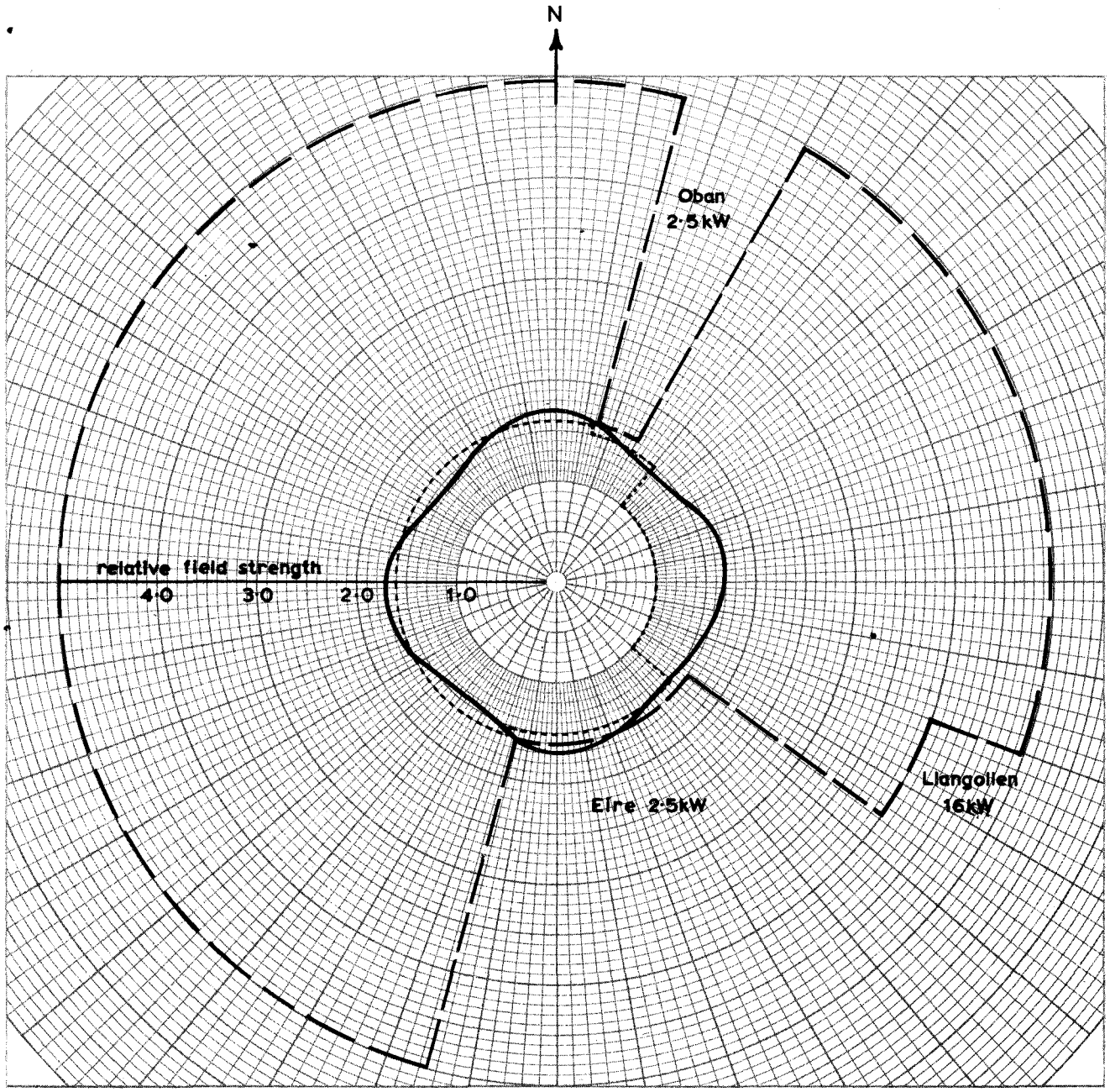

Fig.3 Templet and horizontal radiation pattern of Band II aerial

HORIZONTAL POLARIZATION

88·9(Light), 91·1(Third), 93·3(Northern Ireland Home), Mc/s

Mean effective gain 1·7dB — — — Maximum permissible E.R.P.

Transmitter power 2x0·85kW ---------- Minimum desirable E.R.P.

Mean E.R.P. 2·5kW

Unit field corresponds to an E.R.P. of 1·0kW

Printed by BBC Research Department, Kingswood Warren, Tadworth, Surrey